

WHAT IS CLAIMED IS:

1. A method of producing a color filter that includes filter elements arranged over a substrate, the method comprising:

a first main scanning step of scanning, in a main scanning direction, one of the substrate and a head relative to the other of the substrate and the head, the head having a nozzle row that includes an arrangement of a plurality of nozzles, while discharging a filter material from the plurality of nozzles to the substrate; and

a second main scanning step of scanning one of the head and the substrate relative to the other of the head and the substrate along the main scanning direction while discharging a filter material to the substrate after the first main scanning step, the second main scanning being performed such that a portion of a crossing region of the nozzle row and the substrate overlaps with at least a portion of a crossing region of the nozzle row and the substrate in the first main scanning step.

2. The method of producing a color filter according to Claim 1, the first main scanning step being performed multiple times so that the crossing region of the nozzle row and the substrate in each performance of the first main scanning step does not overlap with crossing regions in other performances of the first main scanning step.

3. The method of producing a color filter according to Claim 2, the second main scanning step being performed multiple times so that the crossing region of the nozzle row and the substrate in each performance of the second main scanning step does not overlap with crossing regions in other performances of the second main scanning step.

4. The method of producing a color filter according to Claim 1,
the nozzle row being at least substantially divided into a plurality of groups;
and

the second main scanning step being performed so that the crossing region of each of the groups and the substrate in the first main scanning step overlaps with the crossing region of at least one of the other groups and the substrate in the first main scanning step.

5. The method of producing a color filter according to Claim 1, further comprising:

a sub-scanning step of scanning one of the head and the substrate relative to the other of the head and the substrate in a sub-scanning direction crossing the main scanning direction,

the nozzle row being inclined at an angle relative to the sub-scanning direction.

6. The method of producing a color filter according to Claim 5, a length of the nozzle row being L, a number of the nozzle groups being n, and an angle formed by the nozzle row and the sub-scanning direction being θ , the amount δ of sub-scanning movement being represented as follows:

$$\delta \approx \text{Integral multiple of } (L/n) \cos \theta.$$

7. The method of producing a color filter according to Claim 1, nozzles arranged at both ends of the nozzle row being controlled so as not to discharge the filter material.

8. The method of producing a color filter according to Claim 7, a length of the nozzle row, except a portion corresponding to the nozzles controlled not to discharge the filter material, being L, a number of the groups being n, and an angle formed by the nozzle row and the sub-scanning direction being θ , a length δ of sub-scanning movement being represented as follows:

$$\delta \approx \text{Integral multiple of } (L/n) \cos \theta.$$

9. The method of producing a color filter according to Claim 1,
at least one of the first and second main scanning steps being performed by a plurality of the heads;

the plurality of the heads discharging filter materials of different colors; and
at least one of the first and second main scanning steps being performed for each head.

10. The method of producing a color filter according to Claim 1,
the head having a plurality of nozzle rows; and
the plurality of nozzle rows discharging filter materials of different colors.

11. An apparatus for producing a color filter by arranging filter elements on a substrate, the apparatus comprising:

a head that includes a nozzle row having a plurality of nozzles arranged in a row; and

a main scanning device that scans one of the head and the substrate relative to the other of the head and the substrate in a main scanning direction, the main scanning device performing main scanning multiple times so that a portion of a crossing region of the nozzle row and the substrate in each performance of main scanning overlaps with at least a portion of crossing regions in other performances of main scanning.

12. A method of manufacturing a liquid crystal device that includes a pair of substrates, a liquid crystal disposed between the pair of substrates, and a color filter formed over one of the pair of the substrates, the method comprising:

producing the color filter by the method of producing a color filter according to Claim 1.

13. An apparatus for manufacturing a liquid crystal device that includes a pair of substrates, a liquid crystal disposed between the pair of substrates, and a color filter formed over one of the pair of substrates, the apparatus comprising:

the apparatus for producing a color filter according to Claim 11.

14. A method of manufacturing an EL device that includes an EL luminescent layer which is arranged in a dot arrangement over a substrate by arranging an EL luminescent material over the substrate, the method comprising:

a first main scanning step of scanning, in a main scanning direction, one of the substrate and a head relative to the other of the substrate and the head, the head having a nozzle row that includes an arrangement of a plurality of nozzles, while discharging the EL luminescent material from the plurality of nozzles to the substrate; and

a second main scanning step of scanning one of the head and the substrate relative to the other of the head and the substrate along the main scanning direction while discharging the EL luminescent material to the substrate, the second main scanning step being performed such that a portion of a crossing region of the nozzle row and the substrate overlaps with at least a portion of a crossing region of the nozzle row and the substrate in the first main scanning step.

15. The method of manufacturing an EL device according to Claim 14, the first main scanning step being performed multiple times so that the crossing region of the nozzle row and the substrate in each performance of the first main scanning step does not overlap with crossing regions in other performances of the first main scanning step.

16. The method of manufacturing an EL device according to Claim 15, the second main scanning step being performed multiple times so that the crossing region of the nozzle row and the substrate in each performance of the second main scanning step does not overlap with crossing regions in other performances of the second main scanning step.

17. The method of manufacturing an EL device according to Claim 14,
the nozzle row being at least substantially divided into a plurality of groups;
and

the second main scanning step being performed so that the crossing region of each of the groups and the substrate in the first main scanning step overlaps with the crossing region of at least one of the other groups and the substrate in the first main scanning step.

18. The method of manufacturing an EL device according to Claim 14, further comprising:

a sub-scanning step of scanning one of the head and the substrate relative to the other of the head and the substrate in a sub-scanning direction crossing the main scanning direction,

the nozzle row being inclined at an angle relative to the sub-scanning direction.

19. The method of manufacturing an EL device according to Claim 18, a length of the nozzle row being L, a number of the nozzle groups being n, and an angle formed by the nozzle row and the sub-scanning direction being θ , an amount δ of sub-scanning movement being represented as follows:

$$\delta \approx \text{Integral multiple of } (L/n) \cos \theta.$$

20. The method of manufacturing an EL device according to Claim 14, nozzles arranged at both ends of the nozzle row being controlled so as not to discharge the EL luminescent material.

21. The method of manufacturing an EL device according to Claim 20, a length of the nozzle row, except a portion corresponding to the nozzles controlled not to discharge the EL luminescent material, being L, a number of the groups being n, and an angle formed by the nozzle row and the sub-scanning direction being θ , a length δ of sub-scanning movement being represented as follows:

$$\delta \approx \text{Integral multiple of } (L/n) \cos \theta.$$

22. The method of manufacturing an EL device according to Claim 14, at least one of the first and second main scanning steps being performed by a plurality of the heads;

the plurality of the heads discharging EL luminescent materials of different colors; and

at least one of the first and second main scanning steps being performed for each head.

23. The method of manufacturing an EL device according to Claim 14, the head having a plurality of nozzle rows; and

the plurality of the nozzle rows discharging EL luminescent materials of different colors.

24. An apparatus for manufacturing an EL device by arranging an EL luminescent layer over a substrate, the apparatus comprising:

a head that includes a nozzle row having a plurality of nozzles arranged in a row; and

a main scanning device that scans one of the head and the substrate relative to the other of the head and the substrate in the main scanning direction, the main scanning device performing main scanning multiple times so that a portion of a crossing region of the nozzle row and the substrate in each performance of main scanning overlaps with at least a portion of crossing regions in other performances of main scanning.

25. A method of discharging a material to an object, comprising:

a first main scanning step of scanning, along a main scanning direction, one of a head and the object relative to the other of the head and the object, the head having a nozzle row that includes an arrangement of a plurality of nozzles, while discharging a material from the plurality of nozzles to the object; and

a second main scanning step of scanning one of the head and the object relative to the other of the head and the object along the main scanning direction while discharging a material to the object, the second main scanning step being performed so that a portion of a crossing region of the nozzle row and the object overlaps with at least a portion of a crossing region of the nozzle row and the object in the first main scanning step.

26. The method of discharging a material according to Claim 25,

the first main scanning step being performed several times so that the crossing region of the nozzle row and the object in each performance of the first main scanning step does not overlap with crossing regions in other performances of the first main scanning step.

27. The method of discharging a material according to Claim 26, the second main scanning step being performed several times so that the crossing region of the nozzle row and the object in each performance of the second main scanning step does not overlap with crossing regions in other performances of the second main scanning step.

28. The method of discharging a material according to Claim 25,

the nozzle row being at least substantially divided into a plurality of groups; and

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the second main scanning step being performed so that the crossing region of each of the groups and the object in the first main scanning step overlaps with the crossing region of any one of the other groups and the object in the first main scanning step.

29. The method of discharging a material according to Claim 25, further comprising:

a sub-scanning step of scanning one of the head and the object relative to the other of the head and the object in a sub-scanning direction crossing the main scanning direction,

the nozzle row being inclined at an angle relative to the sub-scanning direction.

30. The method of discharging a material according to Claim 29, a length of the nozzle row being L, a number of the nozzle groups being n, and an angle formed by the nozzle row and the sub-scanning direction being θ , a length δ of sub-scanning movement being represented as follows:

$$\delta \approx \text{Integral multiple of } (L/n) \cos \theta.$$

31. The method of discharging a material according to Claim 25, nozzles arranged at both ends of the nozzle row being controlled so as not to discharge the material.

32. The method of discharging a material according to Claim 31, a length of the nozzle row, except the portion corresponding to the nozzles controlled so as not to discharge the material, being L, a number of the groups being n, and an angle formed by the nozzle row and the sub-scanning direction being θ , a length δ of sub-scanning movement being represented as follows:

$$\delta \approx \text{Integral multiple of } (L/n) \cos \theta.$$

33. The method of discharging a material according to Claim 25, at least one of the first and second main scanning steps being performed by a plurality of the heads;

the plurality of the heads discharging materials of different colors; and at least one of the first and second main scanning steps being performed for each head.

34. The method of discharging a material according to Claim 25, the head having a plurality of nozzle rows; and the plurality of the nozzle rows discharging materials of different colors.

35. An apparatus for controlling a head that discharges a material to an object, the apparatus comprising:

a main scanning component that scans one of the head and the object along a main scanning direction, the main scanning component performing a plurality of main scannings so that a portion of a crossing region of a nozzle row and the object in each performance of main scanning overlaps with at least a portion of a crossing region in other performances of main scanning.

36. An electronic apparatus, comprising:

a liquid crystal device manufactured by the method according to Claim 13, the liquid crystal device being usable as a display section.

37. An electronic apparatus, comprising:

an EL device manufactured by the method according to Claim 14, the EL device being usable as a display section.

38. An electronic apparatus, comprising:

a component manufactured by the method of discharging a material according to Claim 25.

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